

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1. (Currently Amended) A finger unit comprising: a finger root part, a fingertip part, and a joint part for linking the finger root part and the fingertip part; wherein the joint part supports the fingertip part revolvably around a joint axial line that is orthogonal to a center axis of the fingertip part; the finger root part comprises a joint driving actuator for revolving the fingertip part around the joint axial line; and the fingertip part comprises a revolving member that is supported in a revolvable state by the joint part, a rotating member that is supported in a state of rotation around the center axis of the fingertip part by the revolving member, and a rotation drive actuator for rotating the rotating member, wherein the rotation drive actuator is supported by the revolving member;

wherein the finger root part comprises a mounting flange and the joint driving actuator mounted on the mounting flange; and the joint part comprises a drive-side bevel gear that is coaxially fixed in place at a distal end of a rotation output axle of the joint driving actuator, a pair of bearing housings that extend from a front surface of the mounting flange through both sides of the drive-side bevel gear and protrude forward, bearings that are mounted in the bearing housings, a joint axle that is rotatably supported at both ends by the bearings and that is aligned in a direction orthogonal to the center axis of the rotation output axle of the joint driving actuator, a driven-side bevel gear that is coaxially fixed in place to the joint axle and that is

meshed with the drive-side bevel gear, and a linking member that is fixed in place at one end to the joint axle and that extends in a direction orthogonal to the joint axle; wherein the revolving member of the fingertip part is linked to the linking member.

2-3. (Canceled)

4. (Currently Amended) The multi-joint finger unit according to claim 3 claim 1, wherein the joint axle is a hollow joint axle comprising a hollow part for wiring.

5. (Currently Amended) The finger unit according to claim 1 claim 4, wherein the rotating member of the fingertip unit part is a cylindrical outer casing of the fingertip part.

6. (Previously Presented) The finger unit according to claim 1, wherein a drill, driver bit, or other operating tool is coaxially mounted on the rotating member of the fingertip part.

7. (Currently Amended) A multi-joint finger unit comprising: a finger root part, a finger intermediate part, a fingertip part, a finger-root-side joint part for linking the finger root part and the finger intermediate part, and a fingertip-side joint part for linking the finger intermediate part and the fingertip part; wherein the finger-root-side joint part supports the finger intermediate part revolvably around a joint axial line that is orthogonal to a center axis of the finger intermediate part; the finger root part

comprises a finger-root-side joint driving actuator for revolving the finger intermediate part around the joint axial line; the fingertip-side joint part supports the fingertip part revolvably around a joint axial line that is orthogonal to a center axis of the fingertip part; the finger intermediate part comprises a fingertip-side joint driving actuator for revolving the fingertip part around the joint axial line; and the fingertip part comprises a revolving member that is supported in a revolvable state by the fingertip-side joint part, a rotating member that is supported in a state of rotation around the center axis of the fingertip part by the revolving member, and a rotation drive actuator for rotating the rotating member, wherein the rotation drive actuator is mounted on the revolving member;

wherein the finger root part comprises a mounting flange and the finger-root-side joint driving actuator mounted on the mounting flange; and the finger-root-side joint part comprises a drive-side bevel gear that is coaxially fixed in place at a distal end of a rotation output axle of the finger-root-side joint driving actuator, a pair of bearing housings that extend from the front surface of the mounting flange through both sides of the drive-side bevel gear and protrude forward, bearings that are mounted in the bearing housings, a joint axle that is rotatably supported at both ends by the bearings and that is aligned in a direction orthogonal to the center axis of the rotation output axle of the finger-root-side joint driving actuator, a driven-side bevel gear that is coaxially fixed in place to the outer peripheral surface of the joint axle and that is meshed with the drive-side bevel gear, and a linking member that is fixed in place at one end to the joint axle and that extends in a direction orthogonal to the joint axle; wherein the revolving member of the intermediate part is linked to the linking member.

8-11. (Canceled)

12. (Currently Amended) The multi-joint finger unit according to claim 11
claim 7, wherein the joint axle is a hollow joint axle comprising a hollow part for
wiring.

13. (Canceled)

14. (Currently Amended) The multi-joint finger unit according to claim 13
claim 20, wherein the joint axle is a hollow joint axle comprising a hollow part for
wiring.

15. (Currently Amended) The multi-joint finger unit according to claim 7
claim 12, wherein the rotating member of the fingertip part is a cylindrical outer
casing of the fingertip part.

16. (Previously Presented) The multi-joint finger unit according to claim 7,
wherein a drill, driver bit, or other operating tool is coaxially mounted on the rotating
member of the fingertip part.

17. (Previously Presented) A multi-finger grasping mechanism having a
plurality of finger units, wherein each of the finger units is the finger unit according to
claim 1.

18. (Previously Presented) A multi-finger grasping mechanism having a plurality of multi-joint finger units, wherein each of the multi-joint finger units is the multi-joint finger unit according to claim 7.

19. (Original) The multi-finger grasping mechanism according to claim 18, comprising: at least three of the multi-joint finger units; and a common finger unit mounting plate on which the multi-joint finger units are supported.

20. (New) A multi-joint finger unit comprising: a finger root part, a finger intermediate part, a fingertip part, a finger-root-side joint part for linking the finger root part and the finger intermediate part, and a fingertip-side joint part for linking the finger intermediate part and the fingertip part; wherein the finger-root-side joint part supports the finger intermediate part revolvably around a joint axial line that is orthogonal to a center axis of the finger intermediate part; the finger root part comprises a finger-root-side joint driving actuator for revolving the finger intermediate part around the joint axial line; the fingertip-side joint part supports the fingertip part revolvably around a joint axial line that is orthogonal to a center axis of the fingertip part; the finger intermediate part comprises a fingertip-side joint driving actuator for revolving the fingertip part around the joint axial line; and the fingertip part comprises a revolving member that is supported in a revolvable state by the fingertip-side joint part, a rotating member that is supported in a state of rotation around the center axis of the fingertip part by the revolving member, and a rotation drive actuator for

rotating the rotating member, wherein the rotation drive actuator is mounted on the revolving member;

wherein the fingertip-side joint part comprises: a drive-side bevel gear that is coaxially fixed in place at a distal end of a rotation output axle of the fingertip-side joint driving actuator that protrudes from the finger intermediate part towards the fingertip part; a pair of bearing housings that are linked to the revolving member of the finger intermediate part and that extend through both sides of the drive-side bevel gear and protrude forward; bearings that are mounted in the bearing housings; a joint axle that is rotatably supported at both ends by the bearings and that is aligned in a direction orthogonal to the center axis of the rotation output axle of the fingertip-side joint driving actuator; a driven-side bevel gear that is coaxially fixed in place to the outer peripheral surface of the joint axle and that is meshed with the drive-side bevel gear; and a linking member that is fixed in place at one end to the joint axle and that extends in a direction orthogonal to the joint axle; wherein the revolving member of the fingertip part is linked to the linking member.

21. (New) The multi-joint finger unit according to claim 20, wherein the rotating member of the fingertip part is a cylindrical outer casing of the fingertip part.

22. (New) The multi-joint finger unit according to claim 20, wherein a drill, driver bit, or other operating tool is coaxially mounted on the rotating member of the fingertip part.

23. (New) A multi-finger grasping mechanism having a plurality of multi-

joint finger units, wherein each of the multi-joint finger units is the multi-joint finger unit according to claim 20.

24. (New) The multi-finger grasping mechanism according to claim 23, comprising: at least three of the multi-joint finger units; and a common finger unit mounting plate on which the multi-joint finger units are supported.

25. (New) A multi-finger grasping mechanism having a plurality of finger units, wherein at least one of the finger units comprises: a finger root part, a fingertip part, and a joint part for linking the finger root part and the fingertip part; wherein the joint part supports the fingertip part revolvably around a joint axial line that is orthogonal to a center axis of the fingertip part; the finger root part comprises a joint driving actuator for revolving the fingertip part around the joint axial line; and the fingertip part comprises a revolving member that is supported in a revolvable state by the joint part, a rotating member that is supported in a state of rotation around the center axis of the fingertip part by the revolving member, and a rotation drive actuator for rotating the rotating member, wherein the rotation drive actuator is supported by the revolving member, and a drill, driver bit, or other operating tool is coaxially mounted on the rotating member of the fingertip part.

26. (New) A multi-finger grasping mechanism having a plurality of multi-joint finger units, wherein at least one of the multi-joint finger comprises: a finger root part, a finger intermediate part, a fingertip part, a finger-root-side joint part for linking the finger root part and the finger intermediate part, and a fingertip-side joint part for

linking the finger intermediate part and the fingertip part; wherein the finger-root-side joint part supports the finger intermediate part revolvably around a joint axial line that is orthogonal to a center axis of the finger intermediate part; the finger root part comprises a finger-root-side joint driving actuator for revolving the finger intermediate part around the joint axial line; the fingertip-side joint part supports the fingertip part revolvably around a joint axial line that is orthogonal to a center axis of the fingertip part; the finger intermediate part comprises a fingertip-side joint driving actuator for revolving the fingertip part around the joint axial line; and the fingertip part comprises a revolving member that is supported in a revolvable state by the fingertip-side joint part, a rotating member that is supported in a state of rotation around the center axis of the fingertip part by the revolving member, and a rotation drive actuator for rotating the rotating member, wherein the rotation drive actuator is mounted on the revolving member, and a drill, driver bit, or other operating tool is coaxially mounted on the rotating member of the fingertip part.